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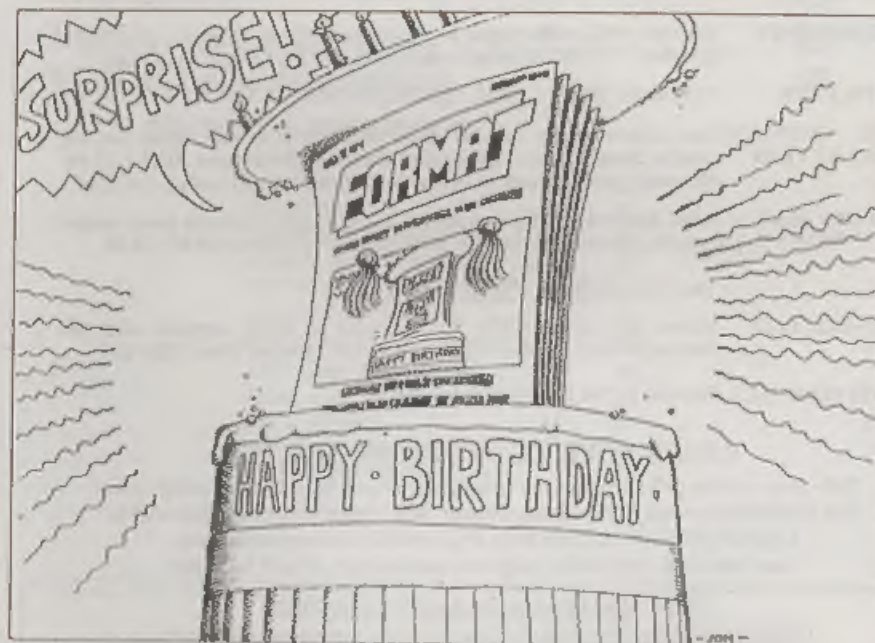
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September 1995.

FORMAT

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CONTENTS

Vol.9 N°1.

September 1995.

- ◆ News On 4 4
- ◆ The Editor Speaks 5
- ◆ Short Spot 7
- ◆ Variables On A Theme - Part 4 13
- ◆ The Help Page 17
- ◆ Small Ads 22
- ◆ SAM C Add-Ons 23
- ◆ Your Letters 25
- ◆ Fastfile Sorting & Printing - Part 2 29
- ◆ FORMAT Readers Service 39

THIS MONTHS ADVERTISERS:-

ADVENTURE PROBE	12
ATOMIC SOFTWARE	32
B.G.SERVICES	2
CHEZRON SOFTWARE (OUTLET)	22
FORMAT (SAM REPAIR SERVICE)	22
FRED PUBLISHING	Back Cover
GLOUCESTER SHOW	36
HILTON COMPUTER SERVICES	28
J.R.C. CAMERA REPAIRS	12
REVELATION SOFTWARE	20
S.D.SOFTWARE	6
STEVE'S SOFTWARE	16
WEST COAST COMPUTERS	26

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NEWS ON 4

SHOWS, SHOWS & MORE SHOWS

Saturday October the 14th is a very special day. Not only is it the date of the next Gloucester show but it is also the date chosen for two others. The first, run by the German Sinclair group, will be held at the Hotel Schinderbuckel in Filderstradt which is about 12 miles from Stuttgart. For more details write to Thomas Ederle, Gastackerstr. 23, 70794 Filderstradt, Germany.

The second show, called SAMCON 95, is being organized by the Czech SAM user group. I have not had full details of the show as this issue goes to press, but if anyone is interested then give me a ring as I should have them any day now.

Oh No More Psygnosis

One of the biggest names in British software is about to vanish. Industry veteran Psygnosis, taken over by Sony in May 1993, will be reorganized into a new company with Sony Electronic Publishing, and the name Psygnosis will disappear. The most famous game to come from the Psygnosis stable was of course Lemmings, successfully licensed for SAM by Fred Publishing.

The new company, Sony Interactive Europe will take over all the projects of the two existing companies.

PRINTER PRICES

A new report, *The UK Printer Market 1994*, shows that the price you pay for a printer can vary by as much as 25%. It also shows a change in the market with inkjet printers showing the big increase.

The report (which seems to have taken rather a long time to reach publication) values the UK printer market at nearly

£700 million with some 1.6 million printers being sold in 1994. Hewlett Packard claims the largest slice of the market with the HP Deskjet (inkjet) and HP Laserjet (laser) printers accounting for 42% and 63% of their respective markets. HP's market domination is leading to their printer control standards taking over (from the older Epson and IBM Proprinter standards) as the standards other printers have to emulate to stay in the market. This is particularly true in the colour inkjet market where HP has 84% of the sales.

EMAP RIGHTS ROW

The September issue of *PC Review*, a magazine from the EMAP stable, has sparked a major row. The mag features a cover mounted disc containing a Speccy emulator and seven 'classic' games including *Jet Set Willy 2*, *Arkanoid*, *Exolon*, *Player Manager*, *Elite* and *Knight Lore*. It would appear that the emulator and games may have been downloaded from a bulletin board somewhere and that EMAP has failed to check on the copyright position before publishing. The copyright holders of at least two of the games are known to be considering what action to take.

EMAP may use in their defence the fact that emulators and hundreds of Spectrum games are freely available on bulletin boards, and that they considered them to be either PD or shareware. Only time will sort this one out.

Credits: Mark Bull, K.R.Smith, D.Morgan.

URGENT we need your news. Anything you think other people should know about. Each item printed earns the contributor 3 months extra subscription (please claim when next renewing).

The Editor Speaks

Happy birthday to us,
Happy birthday to us,

Happy birthday dear *FORMAT*,
HAPPY BIRTHDAY TO US.

Yes, you've guessed it, its birthday time again with the start of another year for *FORMAT* with the first issue of VOLUME 9... Wow folks, the 97th issue, which means that this years Christmas issue will be number 100, although it is true that if I count the three introductory issues produced in the first few years then this is number 100. Being greedy, I'll celebrate this month, and in December (any excuse for a celebration I say).

So, here we are, the start of volume 9 which we hope we can keep as packed with useful information and interesting articles as the first 8 volumes. This issue contains a special *Your Letters* section which we have packed with some of the replies to the request for details on how people first got started with computers. A varied collection of trips down memory lane that I have certainly enjoyed reading. There will probably be a few more next month if we have room so if you have not written yet it is not too late to put pen to paper or fingers to computer keyboard.

Preparations for the October Show are now going strong and I'm sure it is going to be just as good, if not even better, than those in past years. If anyone wants to bring along software or hardware to demonstrate to other users then please let me know and we will make sure there is some space for you in one of the rooms. But please make sure you bring enough power cables as we always seem to be running out of sockets in the back room.

Carol Brooksbank will be there again, transport willing as she puts it, and I know that the chance of a talk to Carol is one of the main reasons for a visit to the show for many of you. The FRED lunch will be there (Colin having promised not to scare away customers by exposing his knees again).

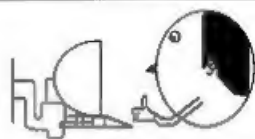
Talking of kilts, I've just got back from a week in bonny Scotland (Jenny's not the only one who gets a holiday you know). Nice holiday, I can highly recommend the Highlands to everyone who likes beautiful scenery and lots of good food. The weather was nice, the only day it rained was the day we went to Edinburgh (which, I am told by the residents, is not unusual).

Now, let me tell you a story. Member buys a mouse system to go with his SAM. The mouse and interface are tested before dispatch but on arrival fail to work right. System returned and tested here with no fault found. Returned to customer, he still can't get it to work. We get his Coupé and the mouse system back and test them here in the office (both together and separately) - everything works fine. Jenny takes mouse and interface home to try on her families SAM, everything works. Pack everything up and return it to customer and he still can't make it work. If there is anyone out there in *FORMAT* land who thinks they can throw some light on this mystery then please, please, let us know - it is driving us round the bend.

Oh well, that's it for another month, glad to say that the office has cooled down a bit now so I'm a lot happier now. Until next month.

Bob Brenchley, Editor.

S D S SOFTWARE



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nb. This is not a PC emulator.
As used by Format Publications to transfer articles and programs for this mag.

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*Requires MasterDos and MasterBasic to use OPUS+ single density discs.

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Please add £2.00 to price for each 3" disc required.

Please add £0.50 postage for each order (£1.20 outside UK).

* Using SpecMaker Spectrum emulator

**S. D. Software, 70, Rainhall Road,
Barnoldswick, Lancashire, England, BB8 6AB.**

SHORT SPOT

YOUR HINTS, TIPS AND PROGRAMMING IDEAS

Edited By:- John Wase.

I apologise for Short Spot being a bit sporadic this year. I had a little problem with the USA; it ended up as a 3352 mile tour which included a huge loop through North and North Central Mexico. The Wase luck continued to hold. D'you know, we were assured that San Louis Potosi is a very dry place: "No," they said; "No rain for the last two and a half years." Guess where we were stuck in floods for hours. You Godditt! Guess whose Short Spot typing was held up... You know; this sort of thing's the story of my life; man and boy, so to speak... Anyway, enough of this frivolity. If you would like a guided tour through North Mexico, I'll bring two huge photo albums to the next Spectrum and Sam Fair. Meanwhile, let's get on with things.

Deryck Morris of Newport, Shropshire is the first candidate. He writes to me that he's had some success with a Spectrum Lottery program after he was pointed in the right way; he used David Russell's random number generator and slotted this into a program which did the trick. Thanks for letting us know, Deryck.

Next, there is a little note from Robert Purchase of Drummore, Stranraer, on the subject of POKE 23728 on a PLUS D stuck on a grey Spectrum. He mentions politely that this has absolutely no effect on his! Curiouser and curiouser. It looks as though the last few grey Species that Alan Sugar made were sort of hybrids with a disabled or altered +3 ROM, or something, doesn't it. Anyway, Robert, thanks for the information, and maybe

you're lucky that nothing does happen!

However, I have here the answer to this conundrum, too. Steve Brook of Spencer's Wood, Reading, writes to tell us all of the astonishingly curative power of Short Spot. Indeed, just to have a letter mentioned seems to do the trick! The miraculous cure I refer to follows from Steve's original query, and the legendary Miles Kinloch's answer in June's issue on the POKE 23728 problem. "OK," thought Steve, "I'll try the new program. Wait a minute, though," he writes, "You were talking about the +2A. So I checked the February issue, and sure enough, I was talking about my original GREY +2 that gave the curious NOT'40:17 message. No problem, run upstairs and dig out my original Grey one (as I'm still using my car boot bargain). So I connected it up and typed in the first program (Dec issue) just to check if it WAS that computer. BUT, No Problem: it worked OK. So I tried all the combinations, with PLUS D connected; without; with +Sys loaded; without; I tried my +2A (it really does say +2B underneath) as it stands, and modified with the fixer kit, I tried my car boot special. NOTHING, works every time. How do you do it, John?

Actually, not being one to give up easily, I've just spent all Sunday, trying everything I can think of. Do you remember my original letter talked of ULA's and the TETRIS screen? Well, the original +2 still shows that hidden writing! But now I can't get that NOT'40 message. I can only put it down to two

possible problems. Firstly, I have found that the PLUS D can act strangely if the connection to the computer is not perfect. Secondly, it could be user-error. If I miss out the second POKE (23728,0) it works, but gives a strange message. Unfortunately, it's not the NOT40 message, but USR k, 40:1 Too close to be a coincidence? It must be me! Although I did try the program several times, and I don't see how I could have missed a line out several times! Just goes to show; eh?"

Well, Steve, I guess it needs to be stood for a while! It'll be all right, then. No, seriously, I see you're unemployed, but I hope you've got some basic equipment. Last time you did this was in winter. Speccies, particularly grey ones, are notorious for suffering queer aberrations while they and their power supplies are warming up. Try shoving the whole darn thing, including the power pack, in the fridge, preferably in a sealed pack with a silica-gel pouch in it (not in weather that's too humid, though, cos the pcb and power pack will sweat as soon as they are taken out). When they're nice and chilled out, as it were, try 'em. Wouldn't be surprised to see all sorts of fancy things happen. **DO BE SURE NOT TO TRY THIS IF THE WEATHER IS AT ALL HUMID YOU'LL SHORT SOMETHING AND IT WILL BE EXPENSIVE TIME!**

Finally, Steve was interested to hear of Deryck Morris's problem over a lottery program for a Spectrum, and has offered to provide one for him. How good it is to have friends like Steve around. I have rung Deryck, who will shortly be in touch.

Many thanks, Steve.

Now, while we're on about grey Speccies, I have a short note from Miles Kinloch of Edinburgh, which I think might be of interest to many. Hands up those who have found out something new

about the Spectrum in the last 12 months. Thought so: lead balloon day. Well, here's something I bet you didn't know. This is a quick tip about modes - this time an easy way to detect from within a program which mode the Spectrum is running in. Various other techniques for doing this have been published, but the simplest and most failsafe way must surely be just to test the contents of system variable 23669. If this holds 26, then you're in 48k; if it doesn't then you're in 128k. And that's all there is to it! This should work on any machine; black 128, grey +2, or +2A or a +3. So, what is this mysterious system variable which the Speccie manual describes as "very unlikely to be useful", and why does it have this highly useful side-effect? Well, it forms the high byte of the pointer to the next item in the syntax table in the Spectrum ROM: since this table is at a different location in the 128k shadow ROM (which controls 128k Basic), from the 48k ROM, it can therefore give us a reliable means of finding which mode the computer is in.

The low byte of the pointer, i.e. PEEK 23668, varies with the command being used, but the high byte will always be the same for a given mode. Try this to demonstrate the principle...

```
10 IF PEEK 23669=26 THEN PRIN
T "You are in 48k mode": S
TOP 20 PRINT "You are in 12
8k mode": STOP
```

Many thanks, Miles: you've come up with the goods again!

We'll leave all this grey Speccie nonsense for a minute, for I have here a *Really Rare* occurrence. Paul Mayo of Portsmouth has sent me in a tip for a SPECTRUM +3. Excellent; we don't see these very frequently. "When Tasword +3 loads" writes Paul, "the screen clears and 'Loading Tasword' appears. Then nothing happens for at least 40 seconds

until it is loaded. Did you know that you can modify the loading routine to show a box that is partly filled in each time one of the three Tasword files is loaded?"

Modification procedure:-

1. Load a working copy, not the Tasword Original.
2. Press Symbol shift/a for the Options menu.
3. Select 'B' then ENTER to get into Basic.
4. Delete all of the rest of line 140 after the words 'Loading Tasword'
5. Add the following five new lines:-

```
142 PLOT 103,96: DRAW 25,0:
DRAW 0,-9: DRAW -25,0: DRAW
0,9 144 INK 2: INVERSE 1
146 LOAD "tc2.bin" CODE
25300: PRINT AT 10,13; " ";
REM ONE SPACE 147 LOAD
"tc1.bin" CODE 41984: PRINT
AT 10,14; " "; REM ONE
SPACE 148 LOAD
"tastable.bin" CODE 53248:
PRINT AT 10,15; " ";
INVERSE 0: REM ONE SPACE
```

6. Save as SAVE "DISK" LINE 10 onto your working copy disc, not the Tasword original disc. Saving the program as "DISK" allows Tasword to be loaded from the "Loader" option from the +3 opening menu.

There is just one little problem, and that is when you need to go into Basic. To do this, select Symbol Shift/a as usual for the options menu, and then select 'B'. Then CURSOR DOWN BEFORE PRESSING ENTER, or Tasword will reload and you'll lose all your text file! I've no doubt that one of our readers will find a quick and snappy solution to this problem, and I look forward to including it in a future issue. Many thanks, Paul.

Even now, we can't quite get away from Spectrums, for the next item's pretty universal. Universal, that is, if you don't happen to be cleaning Bill Gates' Windows. (I'm afraid I am [Boo:

Hiss] as I'm typing this on a Pentium notebook. Don't be silly, how could I check all the programs on a SAM/Speccie if I was trying to type on it as well?). Anyway, at the last Gloucester show, Doug Casterton of Hucknall, Notts, talked to me and Carol Brooksbank about setting page format on an Epson Stylus 800 Bubblejet printer. The first thing Carol and I did was to have a little chuckle about Doug's naive assumption that the Epson Stylus would be Epson Compatible. After all, none of their printers is completely compatible with the next, is it. Anyway, the upshot of all this was that although we both made helpful noises, we didn't really know how to make the beastly thing print exactly a page, nor how to set the page up.

Doug, however, is not a man to give up that easily. He hammered at Epson until eventually they gave in and provided him with the solution. This proved to be in the small print of a photocopy of a page from Epson's 'big book' sent to Doug by Miss Amanda Recknell of their Customer support department.

"Measure both top and bottom margins from the top edge of the page." This in spite of page A-4 of the Users' Guide showing the bottom margin measured from the bottom. So with an A4 page of 11.7" long; a default of 1/360" for the defined unit for this command; a top margin of 3/4" and a bottom margin of 1" measuring 10.7" from the top of the page...

Top Margin. $0.750 \times 360 = 270$ defined units
Least significant byte = $270 - \text{int } 270 / 256 = 14$
Most significant byte = $\text{int } 270 / 256 = 1$

Bottom Margin. $10.7 \times 360 = 3852$ defined units
Least significant byte = $3852 - \text{int } 3852 / 256 = 12$
Most significant byte = $\text{int } 3852 / 256 = 15$

```
10 CLOSE #5: OPEN #5:"B"
20 PRINT #5; CHR$( 27; "@" : RE
```

```

M initialize printer
30 PRINT #5; CHR$ 27;"C"; CHR
  $ 70; REM Page length = 7
  0 lines
40 PRINT #5; CHR$ 27;"(";"c";
  CHR$ 4; CHR$ 0; CHR$ 14;
  CHR$ 1; CHR$ 12; CHR$ 15;
  REM Top margin 3/4"; Bot
  tom 10.7"
50 CLOSE #5

```

And Doug ends by cynically noting that he supposed that putting this in a user guide is really too much to ask, but it would avoid having to obtain a Master's degree in cryptography.

I know there have been one or two queries about Epson stylus printers in the past, and I hope this helps. I also include it as an example of the way **FORMAT** readers refuse to be deterred, pursuing their objectives with obstinate stubbornness. Great stuff, Doug; you got there.

Now for SAM. And with SAM, we come to a tale of woe. Maurice Smith of Ipswich has written to me about Robert Brady's DEF PROC 'Findit s'. It seemed just the job. After all, Maurice has a very large program he's playing with, and is still trying to debug. It's full of DEF PROCS - umpteen, in the words of Maurice, and they're very difficult to keep track of. Maurice typed it in and saved it. Then he did a second version, but renumbered, so that it would have line numbers in the 65k range. Tried it - didn't work. Only thing it would work on was itself. Maurice did, however, read the MasterBasic manual on HIDE, and has become an expert on Hiding files! On one occasion, when trying to search one of Maurice's programs, the routine stopped with the error message 'unable to find label' as if the 'GOTO label' instruction in line 50030 was directed to the program being searched instead of the hidden routine. Maurice adds "In his comments about the HIDE feature on

page 37, Dr. Andy Wright states that GOTO and GOSUB cannot be used with line numbers that refer to parts of the hidden program." "I realise that labels are not line numbers as such, but it is odd that the routine only seems to work on its own copy which contains these label names. Is there something I've missed or have not understood? I would be most grateful if you could find out what is wrong, as this is a routine I would find most useful." Poor Mr. Smith. Can anyone help?

David Laundon of Leicester has also sent me a program for a gambling SAM. Yes, folks, we're back at the lottery again. BUT don't get turned off; this program is completely different. This, so David tells us, is a program which picks up to 5 boards of random numbers and prints out playslips on a 'normal Epson-compatible' printer in a form which can be read by the National Lottery Terminals. AND the printouts have been thoroughly tested on the National Lottery Terminal at his father's shop. But he daren't chance; them in case those numbers came up!

Well David, knowing how abnormal 'normal' Epson-compatible printers can be, I suspect we're going to have some fun with this one. Anyway, let's type it in for a bit of fun, shall we...

```

10 MODE 3: CSIZE 8,24: CLS #:
  PRINT AT 3,0;"National Lo
  ttery Random Number Picker
  and Auto Playslip Printer
  "; TAB 16;"by David Laundo
  n May 1995. V2.0": CSIZE
  8,9
20 CLOSE #3: OPEN #3;"b": LET
  e$=CHR$ 27,f$=CHR$ 10,b$=
  CHR$ 219,bb$=STRING$(4,b$+
  " ")+b$+b$+b$+" ",marg
  in=10,t$=STRING$(margin,"
  ")
30 LPRINT CHR$ 7;e$;"M";CHR$
  15;e$;"A";CHR$ 18;e$;"6";e
  $;"t1";t$;b$;" ",bb$;bb

```

```

$,bb$;bb$;bb$;bb$;f$
40 LPRINT e$;"A";CHR$ 13;t$;"
  "; FOR b=1 TO 5: LPR
  INT STRING$(5,CHR$ 223);"
  Board ";CHR$ (CODE "A"+b-1
  );" ";STRING$(5,CHR$ 223);
  " "; NEXT b: LPRINT f$
50 LPRINT e$;"A";CHR$ 18;
60 DO : INPUT "How many board
  s do you wish? (1 to 5): "
  ;boards: LOOP WHILE boards
  <1 AND boards>5
70 RANDOMIZE : DIM l$(10,107)
80 FOR b=1 TO boards: FOR n=1
  TO 6
90 DO : LET p=RND(47)+RND(1),
  c=b*22+4*p MOD 5-21,r=p DI
  V 5+1,p=p+1: LOOP UNTIL l$(
  r,c)=""
100 LET l$(r,c TO c+2)=b$+STR$(
  p DIV 10)+STR$(p MOD 10
  )
110 NEXT n: NEXT b
120 FOR r=1 TO 10
130 LPRINT t$;" ",l$(r);"
  ";(b$ AND (r=2 OR r=4));
  f$
140 NEXT r
150 LPRINT e$;"A";CHR$ 24;f$;e
  $;" 1";STRING$(margin+116,
  " ")e$;"@";
160 CLOSE #3: OPEN #3;"p"

```

Here's a little description of what's going on.

Line 10: Prints a silly message.

Line 20: OPENS LPRINT for binary output to allow the control codes to pass unchanged. Also sets some constants: f\$ is a line feed. Change this to " if your printer does an automatic line feed. b\$ is a solid block character, and margin is the size of the left margin.

Line 30: Sets the printer settings (condensed elite, line spacing, etc.) and prints the control marks along the top.

Line 40: Sets different line spacing and prints the line with the board labels.

Line 50: Sets final line spacing (these have to be just right for the terminal to read the slips properly).

Line 60 Gets number of boards from the user.

Lines 70-110 Picks the numbers for each board. The rest of the lines are in an array. The position of each number picked is marked, and this is used to check that no number is repeated in the same board.

The rest prints the numbers and a line along the bottom. The payslip should be cut out along the top of the control marks and the line at the bottom, and this should be just the right width.

The only problem now is persuading the shop assistant to try putting this through the terminal!

Many thanks, David.

[Editor's note: I'm sorry that we can't reproduce the example prints David sent. Firstly they were printed with an old ribbon which made them far too light to copy, and secondly Royal Mail managed to rip them. Please readers, if you send illustrations then make sure they are a nice dense black, well packed without folding, and send at least two copies just in case. Bob.]

Finally, again, just so that those SAM aficionados won't think I've forgotten them totally, here's a little scribble all in pencil that came in from Chris O'Sullivan of Stetchford, Birmingham. It's a nice little piece to finish with, but it might well not work. That's because there was no disc. And that's why it's so old. It takes a lot of time (which I haven't got) to type programs in, with no guarantee that they're OK. Don't forget, I'm typing them in as text into an IBM-compatible. A disc costs around 20p, less than the postage. PLEASE, MAKE MY LIFE EASIER! IT'S DIFFICULT ENOUGH AS IT IS, AT THE MOMENT. 'Nuff said: here we are: just a snippet to make SAM's font bold. 100% Basic; no Data statements.

First, save a copy of SAM's normal font with SAVE "normal" CODE 20880,1018 This makes it easy to return things to

normal by loading it back in.

```
10 MODE 4
20 LET a=CDPEEK SVAR 5667+256
30 FOR b=32 TO 127
40 PRINT AT 0,0; CHR$ b
50 FOR c=0 TO 7
60 FOR d=0 TO 7
70 IF POINT (0,173-c)<>0 THEN
  PLOT 1, 173-c
80 ROLL 3,1,0,173,8,8
90 NEXT d
100 NEXT c
110 FOR e=0 TO 7
120 POKE a+e,0
130 LET f=128
140 FOR g=0 TO 7
150 IF POINT (0+g,173-a)<>0 TH
  EN POKE a+e, PEEK(a+e) BOR
  I
160 LET f=f/2
170 NEXT g
180 NEXT e
190 LET a=a+8
200 NEXT b
```

When the program has finished running, the new font can be saved with:-

SAVE "bold" CODE 20880,1016

Many thanks, Chris.

And that's all for this month, folks.

In spite of there being several issues short, I'm still not by any means overflowing with contributions. So, now you've got the summer hols out of the way, but still have nice warm evenings, get the Speccy out on that patio table with the extension lead, get a nice cool drink and start typing. Send, please, the snippets to me:-

John Wase,
Green Leys Cottage,
Bishampton,
Pershore,
Worcs,
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See you all next month.

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VARIABLES ON A THEME

Part 4.

By:- Dilwyn Jones.

OK, I'm back, so I hope you are set for another dose of information on the Spectrum's system variables.

If you have read the first three articles in this series then you will already know that system variables are those bytes in memory that help the Spectrum to remember certain things it needs to know about itself, they are the storage locations used by the ROM routines that make the Spectrum work.

I will continue with them, in order, from where I left off last time.

♦ 23641/2
♦ E LINE

This system variable points to the start of the area above the variables. From this we can gain an idea of how much memory is used in bytes by screen, system variables, program and variables, once the program has been RUN to set up the variables etc. Type this in, as a direct command:-

PRINT PEEK 23641+256*PEEK 23642-16384

We can also tell how much room is used for variables once the program has been RUN to set up the variables. Use the command:-

PRINT PEEK 23641+256*PEEK 23642-PEEK 23627-256*PEEK 23628

♦ 23653/4
♦ STKEND

This system variable contains the address of where the spare part of memory starts. From reading this we can

gain an idea of how much memory we have left by subtracting it from RAMtop. This will not include memory used for the machine/GOSUB stacks but includes the length of the PEEK statement. So, this is only a fairly accurate guide... but one which is adequate from most circumstances.

PRINT PEEK 23730+256*PEEK 23731-PEEK 23653-256*PEEK 23654

♦ 23655
♦ BREG

This is a store used by the ROM's Floating Point Calculator (FPC) to hold a copy of the B register during certain calculations.

♦ 23656/7
♦ MEM

This pair of bytes is used by the FPC to hold the address of the area of memory it uses as temporary storage. It is usually 23698 (MEMBOT) but may be different.

♦ 23658
♦ FLAGS 2

This system variable contains some flags used (normally) by the computer to indicate certain conditions.

The best use we can make of this is to utilise the flag indicated by bit 3. This being a one indicates Caps Lock on or Caps Lock engaged.

What use is that? Consider in a program using INKEY\$; eg. in a menu of options in a filing program, we often need to know whether the operator is

pressing a certain key. If the operator is invited to press 'Y' for Yes or 'N' for No, he/she may press 'y' for Yes or 'n' for No - mixing up lower case and upper case capitals. Most often this would depend on whether Caps Lock was engaged - people are not interested in upper or lower case and whether they press 'y' or 'Y' they expect the computer to understand as humans would. But the computer doesn't really appreciate that. So if we engage Caps Lock automatically, our worries are over and we have a simpler program which doesn't have to check (as far as it's concerned) two separate options for each choice.

It is tempting to use the Basic statement `POKE 23658,0` to engage Caps Lock and `POKE 23658,0` to disengage it. However, this will affect the other flags in the byte, so do check their state first unless you know they are not any particular value. Normally in L mode, 23658 has a value of zero so it is generally OK to use the POKES above. You are not likely to cause crashes, but some funny effects may be caused in rare cases. When the ZX printer buffer is empty, bit 1 will be zero.

•23659 •DF SZ

This system variable contains the number of lines in the lower section of the screen, normally used for INPUTs, error reports and so on. Normally this would be a two, except for when a long INPUT prompt is displayed, etc. If a value of zero is POKEd in, normally to attempt to clear this unused part so that we can use the whole 24 lines of the screen, the computer crashes.

However, this can be done within a few restrictions. These are that we must ensure the lower part of the screen is

restored to normal before any use is made of this - so to break out of a program would be somewhat catastrophic! Also, errors generated within the course of a program will have the same effect since the error report would have to be printed out.

Here is a short listing to demonstrate the use of line 22 and 23 on the screen. Unfortunately, it only works for PRINT or PRINT TAB as we cannot use PLOT down here and PRINT AT will only work down to line 22. The screen is restored to normal by `POKE 23659,2` within the program.

```
10 POKE 23659,0
20 FOR A=0 TO 23
30 PRINT A
40 NEXT A
50 PAUSE 0
60 POKE 23659,2
```

To demonstrate what can go wrong, let us generate an error by adding this line to the program:-

```
45 PRINT error
```

Ooops!!! If you just want to PRINT on the bottom two lines it is usually better to use `PRINT #1,"text"` which works just as well, if not better, without such a risk of causing a system crash. If you POKE a value greater than two into DF SZ the upper screen will become smaller than normal. So after `POKE 23659,Y` the upper screen would be 24-Y rows down and would scroll when the PRINT position got to or beyond 24-Y,0.

This program shows how a part screen scroll can be maintained with DF SZ and SCR CT. Here, random numbers appear and scroll up the top 14 lines of the screen only.

```
10 POKE 23692,0: POKE 23659,10
20 PRINT RND
30 GOTO 10
```

•23670/1

•SEED

When RANDOMIZE (number) is used, the number (a constant or a variable) is stored in this system variable. This is the number that determines the next random number. It opens up the possibility of cheating, since you could work out the next (supposedly) random number generated and use the knowledge gained to 'swing' luck your way. For example, after `RANDOMIZE 1`, the next value of RND would be `(0.0022736596,INT (RND*6)+1)` to simulate a die being thrown as a one.

•23672/3/4

•FRAMES

This is a frame counter which can be used as a timer. It counts frames of a TV picture and so is incremented fifty times a second in the UK, or every 0.02 seconds, although the time taken to actually read and evaluate these three bytes of the timer may not allow it to be used to this accuracy. It has a timing range of nearly four days (actually about three days 21³/₄ hours). The manual (chapter 18) points out that you need to read the value of these three bytes twice in succession and take the high value for full accuracy because of the possibility of the values of the three changing while being read in such a way as to cause large inaccuracies.

It must be emphasised that the timer bytes are in the opposite order to what you might expect - the most significant byte is 23674, so the timer values are read by:-

```
65636*PEEK 23674+256*PEEK 23673+
PEEK 23672
```

which returns time in units of fiftieths of a second. There are several things that

affect the accuracy of this timer. Using BEEP stops the timer. Using the printer or loading/saving to disc or tape, etc, also affect its accuracy. However, the use of PAUSE is OK as this only waits a specified time without re-setting or stopping the timer.

•23675/6

•UDG

The address of the start of the dot patterns for the user-defined graphics is normally 32600 on a 16K Spectrum or 65368 on a 48K Spectrum. This number is the same as USR "a", so `PRINT USR "a"` corresponds to:-

```
PRINT PEEK 23675+256*PEEK 23676
```

Compulsive POKERS can have fun with this one. The manual suggests changing this to save space by having fewer user-defined graphics. However, it is also possible to do the reverse, and set up more than one user-defined graphics set if required; however, only one set of 21 can be in use at any one time. Remember that since there are 21 UDGs it is necessary to set aside 21*8 (168) bytes for each separate set of UDGs and POKE the start addresses, into 23675/6, of the character set in use.

For fun, type in the following commands:-

```
POKE 23675,96:POKE 23676,255
```

Then, using the user-defined graphics (they normally appear as capital letters until re-defined) try to type out a message. I'll leave you to find out what happens.

This series of articles is extracted from Dilwyn Jones' book, *Delving Deeper into your Spectrum ROM* - first published in the UK by Interface Publications. Although it is now out of print you should be able to obtain a copy through your local library.

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The HELP PAGE

Edited By:- Ray Bray.

I'm sorry there was no Help Page last month but, without any queries it is difficult to put together this section without trespassing on other territory. I guess the hot weather plus the summer holidays has been responsible to some extent for the shortage of questions - I certainly find my garret too hot to work in for most of the day.

Still I'm glad to say that C.Murray of Warrington came up with a substantial question for this month. He has been trying to write a routine for the Spectrum fitted with PLUS D, which will automatically load a file whenever the reset button is pressed. He knows this is possible as he has a PD program which, when the reset button is pressed, presents the user with a disc catalogue from which any file can be loaded. However, although trying several ways of writing the routine, the system always crashed when he pressed the reset button, although the component parts of his routine would work independently.

This was an interesting problem as the routine had to be located in the PLUS D RAM and be triggered only once on reset, and had to load a Basic program from machine code, something which has never been covered fully before in the pages of *FORMAT* and in no other publication that I have seen. The means of triggering the program was the easiest part to solve and the method used was to POKE @16, with the address of our routine to which the PLUS D would JUMP every 50th of second. The routine initially checks the value of the third byte of the system variable FRAMES to ensure it is zero and, if not, it performs a

RETURN. The second byte of FRAMES is then examined and if it is 0 or 1 then the second byte is set to 2 and the loading program is entered. If the byte is greater than 1 then a RETURN is made. In this way the loading program can only be activated within the first five seconds of the reset button being pressed.

Whereas the loading of a CODE program by machine code is relatively simple, to load a Basic program involves making space for it and setting numerous system variables so that it will list and run correctly. To keep the routine within a manageable size it was necessary to make use of the Spectrum ROM routines and, to keep things as simple as possible, it was decided to transfer the loading segment of the program to the printer buffer on activating the routine so that the ROM CALLs could be direct. Thus the first 58 bytes of the program are concerned with checking the FRAMES variable and transferring the loading program to the printer buffer, and the last 115 bytes is the loading program. Although this routine will successfully load the Basic program I must admit that I have been unable to find a way to make it run automatically, so a manual RUN command has to be entered. All attempts to make an auto-run routine failed!

The following program will assemble the routine, but before running it, put the filename of your Basic routine/program (10 character codes including any blank spaces) in the line 170 DATA statement where I have placed X's. Having done this, run the program and save the code. To use the routine the

code should be loaded to address 12628, a POKE @16,12628 executed, and the program will then sit in PLUS D RAM waiting to be activated whenever the reset button is pressed (or if the computer is left on for 86 hours!).

```

10 REM +++ Spectrum PLUS D Aut
o-Load on Reset +++
20 CLEAR 40000; RESTORE 100; I
NPUT "Have you inserted the
filename? (Y/N) "; q$: IF
q$="n" OR q$="N" THEN CLS:
LIST: STOP
30 FOR a=40001 TO 40174: READ
c: POKE a,c; NEXT a
40 CLS: PRINT AT 10,10;"SAVING
FILE": INPUT "Enter filena
me"; f$: SAVE d1 ""+f$ CODE
40001,174
50 CLS 60 PRINT "Having saved
the file now load it at 126
28 (PLUS D RAM) and enter P
OKE @16,12628. The program
is now ready for subsequent
resets during that session
."; STOP
100 DATA 243,33,122,92,215,156,
22,123,254,0,32,45,33,121,9
2,215,156,22,123,254
110 DATA 1,48,34,17,143,49,33,4
,91,14,150,26,213,87,215,13
3,10,209,19,35
120 DATA 13,32,244,22,2,33,121,
92,215,133,10,225,33,4,91,2
29,201,251,201,243
130 DATA 221,33,95,91,207,59,17
,110,91,6,9,207,60,18,19,16
,250,237,91,113
140 DATA 91,42,89,92,43,221,34,
95,92,237,75,111,91,197,205
,229,25,193,229,197
150 DATA 205,85,22,221,33,95,91
,35,237,75,115,91,9,34,75,9
2,221,102,23,221
160 DATA 110,22,34,66,92,62,1,5
0,68,92,193,209,207,61,33,4
3,45,227,205,175
170 DATA 13,62,1,50,68,92,251,1
95,226,18,1,0,0,100,1,X,X,X
,X,X,X,X,X,X,X,X
180 DATA 0,0,0,0,0,0,0,10,0

```

For those readers who might be only be interested in loading a Basic program from machine code, the following source

code listing gives the routine. It differs slightly from the code used in the routine above as that required a different exit procedure.

```

10; LOAD A Basic PROGRAM
;
20   ORG 23300
;
30; Open file & get header:-
;
;   LD IX,ufla ;Start of User
;   File Information Area
;   RST 8
;   DEFB 59
;   LD DE,hdoc
;   LD B,9
ldbyt: RST 8 ;Transfer Header
;   DEFB 60
;   LD (DE),A
;   INC DE
;   DJNZ ldbyt
;
40; Set space and variables valu
es:-
;
;   LD DE,(hdoc) ;Program sta
;   rt address
;   LD HL,(23641) ;E-LINE
;   DEC HL LD (23647),IX ;Sav
;   e IX at X-PTR
;   LD BC,(hdoc) ;File Length
;   PUSH BC
;   CALL 6629 ;RECLAIM-1 (#1
;   9E5)
;   POP BC
;   PUSH HL
;   PUSH BC
;
50   CALL 5717 ;MAKE-ROOM (#16
55)
;   LD IX,(23647) ;Reclaim IX
;   INC HL LD BC,(hdoc) ;Leng
;   th of program variables
;   ADD HL,BC
;   LD (23627),HL ;Set VARS
;   LD H,(IX+23) ;Start line
;   hi-byte
;   LD A,H
;   AND 192
;   JR NZ,ldprog
;   LD L,(IX+22) ;Start line
;   lo-byte
;   LD (23618),HL ;Set NEWPPC
;   LD A,0
;   LD (23620),A ;Set NSPPC

```

```

;
60; Load the program:-
;
ldprog:POP BC ;Length of file
;   POP DE ;Start address
;   RST 8
;   DEFB 61
;   EI
;   RET
;
70; User File Information Area:-
;
;   ufla: DEFB 1
;   DEFB 0
;   DEFB 0
;   DEFB 100 ;Device used = "
;   E"
;   DEFB 1 ;Directory descrip
;   tion
;   DEFB "filename "; 10 byt
;   es including spaces
;   ; The values for the following
;   parameters are loaded by t
;   he program:-
;
;   hdoc: DEFB 0
;   hdoc: DEFW 0
;   hdoc: DEFW 0
;   hdoc: DEFW 0
;   hdoc: DEFW 0
;
;   I hope the above redresses to some
;   extent the lack of Spectrum items we
;   have been able to feature in recent
;   months.
;
;   Now back to the subject of download
;   characters. I mentioned in the July issue
;   that I would let you have a short routine
;   to add to the SAM UDG Designer
;   program which would convert the screen
;   character data produced by that program
;   into printer data for draft characters.
;   Coincidentally I had a letter from Bill
;   Simpson of Mansfield who said that he
;   found the instructions for using that
;   program rather vague so he had given up
;   trying to use it. I agree that the leaflet
;   doesn't win any accolades for clarity so I
;   will also try and throw some light on
;   that aspect of the utility. The new lines
;   to add to the UDG program are as
;   follows:-
2000 REM +++Convert data to down

```

```

load character data+++
2010 CLS: INPUT "Enter number of
download characters to con
vert ";N: PRINT "CONVERTIN
G ";N;" DOWNLOAD CHARACTERS
"
2020 DIM T$(8,8),C(N,9): LET CHR
=1
2030 FOR AD=21776 TO 21967 STEP
8: PRINT "Character ";CHR;"
="; PEN 9; CHR$(143+CHR)
2040 INPUT "Character below or o
n print line? (Enter 0 or 1
)"; Q: LET C(CHR,1)=Q*128
2050 FOR B=0 TO 7: LET D=PEEK(AD
+B),T$(B+1)=BIN$ D: NEXT B
2060 FOR R=2 TO 9: LET BYT=0: RE
STORE 3000
2070 FOR L=1 TO 8: READ BIT
2080 IF T$(L,R)="1" THEN LET BYT
=BYT+BIT
2090 NEXT L
2100 LET C(CHR,R)=BYT
2110 NEXT R: IF CHR=N THEN GOTO
1110
2120 LET CHR=CHR+1: NEXT AD
2130 INPUT "To save download dat
a enter filename, else pres
s RETURN to go to DESIGNER.
";f$: IF f$="" THEN GOTO 1
0
2140 IF LEN f$>10 THEN GOTO 2130
2150 SAVE f$ DATA C(): PRINT "FI
LE SAVED PRESS ANY KEY TO R
ETURN TO DESIGNER": PAUSE:
GOTO 10
3000 DATA 128,64,32,16,8,4,2,1
;
; In addition to the above addendum,
; insert the following new lines in the body
; of the main program:-
25 PRINT PEN 9; AT 14,18;"FOR
DOWNLOAD"; AT 15,18;"PRESS
KEY D"
305 IF INKEY$="D" OR INKEY$="d"
THEN GOTO 2000
;
; To access the download character
; routine from the designer program just
; press key D. A return to the designer is
; made after the download characters are
; assembled and saved. For those readers
; wishing to adapt the above to add to a
; Spectrum UDG program, apart from the
; obvious syntax changes required, line

```

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2030 will have to be amended to extract the screen character data and, in line 2050, LET T\$(B+1)=BIN\$ D needs to be replaced by GOSUB 2160 and the following sub-routine added:-

```
2160 LET X$=""
2170 LET BN=D-INT(D/2)*2
2180 IF BN=0 THEN LET X$="0"+X$
2190 IF BN=1 THEN LET X$="1"+X$
2200 LET D=INT(D/2): IF D=0 THEN
    LET T$(B+1)=X$:RETURN
2210 GOTO 2170
```

For those who have experienced difficulty in using the SAM UDG Designer I hope the following notes will clear up any problems you may have encountered.

Start-up With the start-up screen displayed the program is in the editing/create mode ready to design a character for UDG 144. A pink cursor, which is located in the top left hand cell of the top left hand grid, can be moved by using the four cursor keys to position it in any of the cells. To fill an empty cell, move the cursor to the required cell and press the SPACE bar. The cell will then be coloured blue. To cancel a filled cell, move the cursor over the cell and press the SPACE bar. The start-up screen enables you to create UDG characters 144 to 147, to create other characters the relevant values have to be selected via the menu box at the bottom of the screen.

Using the Menu Box To enter the menu box tap (not press) key N or M and the menu item SAVE will then be outlined in yellow. If the key is pressed for too long the program shoots through the menu box and the prompt "Filename?" appears at the bottom of the screen. To recover from this press RETURN and the program goes to the menu item SAVE. Once securely in the SAVE box the cursor keys can be used to move the

outline over the required item, which can then be selected by pressing the N or M key (not the RETURN key). If the menu box is entered inadvertently a return to the editing/create mode can be made by selecting menu item RETURN

Selecting Character Group To select a new group of four characters to edit/create, enter the menu box and position the outline over the item SELECT then press N or M, holding the key down positively until a arrow appears alongside the two columns of figures on the right hand side of the screen. Using the cursor keys, move the arrow to the first of the four UDG numbers it is required to edit and then press the SPACE bar. The editing grid will scroll to that set of characters, the four numbers will be highlighted in yellow, the number box at the bottom of the screen will indicate the four quadrants in which the characters are located, and a return is made to the edit/create mode

I think the remainder of the menu options are straightforward and should cause no problems given the information above.

Finally, we have a query from D. Birchall of Bolton who has purchased a SAM SCART lead which he finds will not work with his Philips FSQ TV. He has an Amiga which works perfectly with this TV via a SCART lead so he wishes to know what is wrong. Amongst other explanations there are two main reasons why your lead might not work. The first being that there is a faulty connection in the lead, and the second is that the SCART socket on your TV is not standard. However, you do state that "the picture is almost there", can you please expand upon this; is the picture just very dim, or is it scrolling, distorted or covered in interference? Can you also send the pin details of the SCART socket on your TV as this would clear up the

question of incompatible standards. In the meantime has any other reader had experience of using this type of TV with SAM via a SCART lead?

That's all we have for this month. Please keep sending your problems/answers to the following addresses:-

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SAM C ADD-ONS

By:- Carol Brooksbank.

SAM C comes with a good collection of
Library routines, but inevitably we all
find ourselves wanting to use some
which are not there, and so want to write
routines ourselves and set up our own
library. I am going to show you how to
set up a library and start it off with a
couple of routines of my own that you
may find useful. But first, we will fill in a
gap in one of the standard C Libraries.

In the CONIO library, listed on p.56 of
your handbook, you will see that there is
supposed to be a window routine, called
with four parameters. But if you use it,
you will get an error message when you
try to compile your program, because the
routine has been left out of the file
CONIO C by the author.

Our routine is going to be a little
different from the description on p. 56.
There you see
`void window(int a,int b,int c,int
t d)`

Void at the start shows that the routine
was not supposed to return any value.
Our routine will return 0 if any of the
parameters were invalid so that the
window was not set, and 1 if all was well
and the window is set. So we shall need
to make a change to the CONIOH file,
where the header for the routine is
listed. Load this file into SAM C.
Towards the end of the list of routines
you will see the following:-

`extern void window(int a,int b,int
c,int d);`

Change this line to read:-

`extern int window(int l,int r,int
t,int b);`

Now resave "CONIO.H" to your C disc
I have changed the parameter letters
because they stand for left, right, top,
bottom, and it might as well be easy to
remember which is which.

Now load "CONIO C" into SAM C, and
we will add the working routine, right at
the end after the cl() routine. Leave a
couple of blank lines for separators, and
then enter the following lines:-

```
#ifdeclared window
int window(int l,int r,int t,int
b)
{
#asm
```

The first line tells the compiler to use
this routine if it has been declared in the
program. The second is the routine's
name, as it appeared in the header file.
Next comes the brace marking the start
of the routine, and the instruction for
assembly language, because this is to be
a machine code routine.

```
pop af
pop bc
pop de
pop hl
exit
pop bc
push bc
=====
push hl
push de
push bc
push af
```

When a C machine code routine is
called with parameters, its parameters
are on the stack, and the total number of
parameters is the last value on the stack.
The routine must begin by fetching all
these into the registers so that we can
use them, but they must also be pushed

back onto the stack in the right order, because C itself will pop them all off and discard them when returning from the routine. If they are not there, the program will crash. We don't need the number of parameters but we must POP and PUSH it to balance the stack. The parameters are on the stack in reverse order, so POP BC puts the bottom of the window into the C register. E is to hold the top, and L the right hand side. There are not enough ordinary registers for four parameters plus the total number of parameters, so we use the alternate register BC', and put the left side in C'.

```
ld a, (23130)
sub c
jr c, wnderx
```

We check the bottom parameter against the contents of the system variable which holds the maximum allowable bottom row. If our parameter is too low we jump to exit with error.

```
ld b, c
ld e, e
cp b
jr z, wnd2
jr nc, wnderx
```

The top parameter is checked against the bottom. If they are the same, we jump forward to continue, because a one-line window is legitimate. If the top is lower than the bottom, we jump to exit with error

```
wnd2: ld c, a
push bc
ld c, l
ld e, (23131)
cp c
jr c, wnderx
push bc
sxc
push bc
sxc
pop bc
ld a, c
pop hl
cp l
jr nc, wnderx
```

Similarly, the right parameter is

checked against the system variable which holds the maximum right column allowable, and if it passes that test, it is checked against the left parameter. This time they cannot be the same, because a one column window is not allowed, so unless right is greater than left, we jump to the error routine.

```
ld b, a
ld (23096), hl
pop hl
ld (23098), hl
```

The validated parameters are stored in the system variables which hold a window's parameters.

```
ld b, l
ld l, a
ld (23148), hl
```

The top/left parameters are stored in the system variable which holds the position of a window in the upper screen

```
ld hl, l
ret
```

The window is now set. The value in HL is the one returned by a C routine, so HL must hold l to indicate that the window is set.

```
wnderx: ld hl, 0
#endasm
```

If any parameters were invalid, the window could not be set, so the routine returns 0. You do not need RET at the very end of a SAM C assembly language routine, because this is incorporated into #endasm.

```
}
#endif
```

Finally, the closing brace indicates the end of the routine instructions, and #endif tells the compiler that this is where the routine to be included ends

This routine works exactly like the Basic routine WINDOW(l,r,t,b), except that you cannot use WINDOW without parameters to return to using the whole screen. In modes 1,2, and 4, window(0,31,0,18) will do that, and in

mode 3, window(0,84,0,18) must be used. When you have set a window, cls(1) in the GRAPHICS library will clear just the window, while cls(0) will clear the whole screen

In your program, you can check whether the window has been set successfully by using if(window(...)) or if(!window(...)).

The routine will work in all modes. The system variable which holds the maximum allowable bottom/right parameters is automatically updated when the mode is changed, so our checks will always be against the right values for the current mode

Now let us look at setting up your own library. A C library has two files, the header file which lists all the routines in the library, and the code file which contains the actual routines. A header file is very simple to set up. Clear everything out of your C editor, using File/New, and give the new file the name "MYROUTS.H"

```
// MYROUTS.H
// by Carol Brooksbank
#ifndef MYROUTS
#define MYROUTS
extern void flash34(int p,int
c,int d);
extern void permcols(int i,int
p);
#endif
```

This is the header file for our new library, into which we are putting two routines - flash34() and permcols(). The lines starting with // are comment lines. The next two tell the compiler that if there is not already a macro called MYROUTS defined in the program, this is the one to use. The next two lines, starting extern, state that these are the routine names, but the actual routines are somewhere else (in the code file). #endif closes the file. If you always use this pattern in a header file, you can put any filenames you like in it, provided

they match the routines in the code file.

Save this routine to your C disc, use File/New again, give the new file the name "MYROUTS.C" and we will write the code file

The first routine in our library is a FLASH routine for modes 3 and 4. The flash() routine in CONIO works only in modes 1 and 2. This routine is the equivalent of Basic's

```
PALETTE (palette, colour 1, colour2)
```

The only difference is that you cannot call it with just one colour in a palette to cancel the flash - you must call it with int c and int d holding the same colour number to do that.

```
#ifdeclared flash34
void flash34(int p,int c,int d)
//p is the palette no., c,d the
//two colour nos.
{
#asm
pop af
pop de
pop bc
pop hl
push hl
push bc
push de
push af
ld b, e
ld e, l
ld hl, 65535
push hl
pop af
call 340
#endasm
}
```

It is a very simple routine, called with the palette number and two colour numbers. Just like the window() routine we wrote earlier, it starts with #asm and the parameters are fetched from the stack and pushed back on. It uses a standard jump call - JPALET at 340, which puts the colours held in BC in the palette number held in E, if AF holds 65535. All this routine does is put the right values in the right registers and call the jump call

The second routine allows you to make

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permanent (global) changes to PEN and PAPER. The pen(), paper() and color() routines in GRAPHICS make only temporary changes, as in Basic's

PRINT PEN x; PAPER y;

You cannot use them to set new colours with cls(), and although print() responds to them, they have no effect on printf(). This routine allows you to set new global colours which will stay in force till you change them, and cls() will use them, as will all other printing to screen.

```
#ifndef declared permcols
void permcols(int i, int p)
//palette nos. for ink and paper
{
    #asm
    pop af
    pop bc
    pop de
    push de
    push bc
    push af
    ld a, (23104)
    cp 0
    jr z, mod12
    cp 1
    jr z, mod12
    cp 2
    jr z, mod3
    xor a
    ld a, e
    rla
    rla
    rla
    rla
    or e
    ld h, a
    ld a, c
    rla
    rla
    rla
    rla
    or c
    ld l, a
    ld (23112), hl
    ret
    mod12: xor a
    ld a, c
    rla
    rla
    rla
    rla
    or e
    ld (23109), a
    ret
    mod3: xor a
    ld b, 3
```

```
penlp: or e
rrca
rrca
djnz penlp
or e
rrca
ld (23113), a
xor a
ld b, 3
paplp: or c
rrca
rrca
djnz paplp
or c
;
ld (23112), a
;
#endif
```

Although this is a longer routine it is quite simple. It first checks the system variables to find the current screen mode, and then inserts the palette numbers for pen and paper into the appropriate system variables, depending on the mode.

Save this file on your C disc and your new library is complete. Adding to it is very simple. Add the name of your new routine, preceded by extern, to the header file between the existing names and #endif. Don't forget that if your routine is to return a value, you must put int or char as appropriate before the name, void if no value is to return. Any parameters must be listed in the brackets after the name if there are no parameters leave the brackets empty, or put void. In a machine code routine with no parameters you won't need the pop and push sequence at the start.

Routines don't have to be machine code, they can be in C, or in a mixture of assembly language and C, provided that you always enclose any machine code instructions between #asm and #endasm.

From time to time I shall be giving you routines to add to the library, but I hope that you will be adding your own routines, and sharing them with the rest of us through **FORMAT**.

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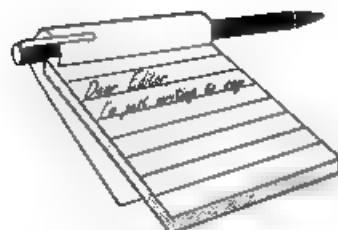
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YOUR LETTERS

For this special birthday issue we asked readers to tell us how they got started in computing. Here are some of the replies we received, we will try and print a few more next month.

Dear Editor,

Fourteen years ago, when I retired from being a technical teacher, I had some money spare to buy myself something I liked, and being interested in computers I bought a ZX80 machine from Sinclair. I read the book and typed in my first simple programs

Some months later I found out that by buying a chip, I could change my machine into a ZX81 which would give me even more possibilities, so I did. I had to alter my programs but it was easier

There was little memory, and saving and loading went with an ordinary tape recorder and took a lot of time. The things I did would often have been quicker by paper and pencil, but I was retired. I still have that machine.

Then the first Spectrum came out and that was what I was waiting for. The features were better, and there were possibilities of printing - what a step forward! The firm I worked for before, started a computer club in the evening, so I went there. At that time there were about 18 people with different machines. Several Sinclair's, Commodore's, Atari's and some others. This club lasted about 6 years and on one demonstration evening we managed to make a 'light message' using 14 machines of different makes, every computer's screen showing a letter at a time

The 48K machine was washed away by

the 128K machine and that was what I wished to have. I did my banking and correspondence with it and sometimes a game. And then O misery, I couldn't buy micro drives and spare parts, they come from England, and Sinclair was finished

On the first of April I read in a magazine that there was a SAMeational new computer coming from a firm called MGT. In the shop where I went for information they said "the first of April son". But, hoping it was not an April fools joke, I wrote a letter to MGT and ordered the compatible computer for Sinclair

It has taken a lot of time for me to get to the stage where I feel everything is going my way. But I now have my second SAM which works to my satisfaction to the things I'm doing with it. English programs I change to Dutch, my English is not too bad but my Dutch is much better I had correspondence with an old Polish soldier who had problems with his printer (and with his food). I had correspondence with a Russian man about a copied Sinclair. And I'm still corresponding with a Portuguese and some English friends

I'm still computing

Yours Sincerely, S.M.S. Kempees,
(The Netherlands).

Dear Editor,

It started in 1965 when I was introduced to the IBM 1401 - a punch card computer, not much bigger than two electric stoves, side by side. The machine it succeeded (and which I never used) was set up by wiring a board with plugs

(in the way an old telephone exchange was operated), and the board inserted in the machine before use. (excuse my writing - my arms are sticking to the paper as I write - due the humid conditions)

The 140 used only punch cards - examples enclosed - and the 1401 was related to the memory of 1400 bytes - as I remember it. One had to be extremely careful to make the best use of memory available, and sometimes, where possible, make temporary use of the memory locations outside for printing and card punching processes.

Having said that, it was surprising the amount of work which could be obtained from this system - in my case controlling purchase and issue of stores and stock taking ... at regular intervals.

Sorting of punch cards was done on a separate machine - and sometimes there was a 'pile up' and cards were damaged - not very often thankfully.

Punch operators, prepared the cards for input (by, it goes without saying, punching holes in the cards, from coded sheets received from clerical staff) - and this was followed by card verifiers who went through the same motions except that, on their machines, they checked that holes had been punched - and also no holes had been punched wrongly

What used to impress me at the time was how the real experts were able to produce a program to carry out a critical Path analysis by making use of individual 'bits'

Finally the programming language 'COBOL' had word marks to show the command and registers.

eg. '1' would be 'one' with a word mark beneath and would be like instruction 'write' On the program the entry was W R would indicate read and the machine memory would contain 2. RW stood for read and write - 3, and so on

The breakdown for all computer program entries followed the following

patterns:-

Command	Register	Register	Modifier
R (read)			
B(branch to)	Posn X		
C (compare)	Entry 1	with	
	Entry 2		
A (add)	Entry 1	+ Entry 2	

I'm not sure now whether C = compare or A = Add, but the above is the general idea of how it worked.

The machine language equivalent would show something like

```
1 Read
5 546 Branch to location 546
8 319 245 Compare contents of 319
with those of 245
2 748 178 3 Add the contents of 748 to
those of 178 if the modifier in 3
indicators a = b.
```

Hope you can make head or tail of my writing.

P.S. There were no error messages, it took ages to find out that 'Space' did not equal zero.

Yours Sincerely, Jack Gibson.

Thanks Jack, but that certainly is not COBOL you are talking about, it looks much more like an assembler type system to me Ed.

Dear Editor,

I started work at 16 around 1967 with the Meteorological Office research and met a mainframe, this was in a room at another site where we would hand in a punched paper tape (I was warned not to use the paper 'confetti' generated by the teletype as confetti as it was so fine it could be dangerous) or stack of punched cards and return a day later for the print out

For any tachie types out there, we used decade counters made with 5 valves, I think these were the last valve counters made

Time moved on, and I converted from the scientific to the engineering side, had

a year in Stornoway and a year in Cyprus. Got married, changed jobs to become an engineering technician in the Civil Aviation Authority at the Heathrow Control Tower. Back then, in 1979, maintenance data was being processed on a mainframe in London (and still is).

Around that time there was a Commodore Pet in the office, I think it came with 8K of RAM and cost about £800. A year or so later I bought a Superboard II, it was about £200 which came all on a single board with 1K of RAM which I upgraded to 8K, it was basically the same as a UK101 if that means anything

After that the Spectrum came on the scene and I bought one second hand from a work colleague for £35, found *FORMAT* and bought a SAM which I've upgraded to 512K and that just about brings me up to date. During this time we've raised 2 girls now 14 and 15, moved house and did everything a young family did

See you in Gloucester in the Autumn

Yours Sincerely, A.C.Windmill

Dear Editor,

In the middle 1950s, I was a member of a small section, that, among other things, offered a computing service. Many of our people spent their days at their desks with a worksheet in front of them, a book of mathematical tables to the right, and an electro-mechanical calculator pounding away to the left. Jobs took days, sometimes weeks.

The beginning of the end of all this was the installation by Ferranti of one of their 'Pegasus' computers in London. Time could be hired on it at, if I remember aright, £3 a minute, normally, you were expected to do your own programming and computer operating, input of programs and data was on punched paper tape and output on a 'Flexowriter', a glorified typewriter that could punch and read paper tape. A few

days crash course on programming (machine-code of course) and I was away. My first program was a simulation of a switching device and I had to dream up some way of producing pseudo-random numbers - a topic that has interested me ever since.

Eventually, we had a computer of our own, an Elliott 803, still machine code and paper tape, though you could have a backing store using magnetic film. Then came high-level languages at that time, Tony Hoare, now a well-known name in computing, was a programmer at Elliotts and no doubt he had something to do with it. First was Elliott Autocode, a simple but very practical language, which we used for years; then ALGOL, and my introduction to structured programming and all that. Basic was not available; I remember collecting a program in Basic at some lecture, and having to translate it into ALGOL to run it.

There was a period in which IBM were trying to sell us a computer, so I had a go at PL/1 and APL.

When I retired in 1976, it seemed that I must say goodbye to this fascinating world of computing, for personal computers had not been invented. But in 1981 my next-door neighbour bought a Sinclair ZX80, and I had a go. Then we both bought ZX81s, and subsequently I had a Spectrum Plus. So Basic and BetaBasic (bringing back the procedures I had got used to in ALGOL) became available. Pascal (HiSoft's version) was another useful language.

And then SAM, with SAM Basic, which is BetaBasic plus many things (and minus a few); more facilities, discs and printers and word-processors; my discovery of *FORMAT* And now another language to learn C, and so on it goes

Yours Sincerely, Ettrick Thomson.

Dear Editor,

I see from the July '95 issue of

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CHEQUES and PO's TO STEVEN PICK

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FORMAT that you're interested to know how your readers got started with computers.

In my case it was a matter of self-defence! In the early 1960's I was the manager of an engineering department in an electronics company. I was sending the brightest of my young engineers off on computing and programming courses so that they could make use of the computing facilities provided by the company. I found that they were coming back talking about all sorts of things which I didn't understand. I couldn't have that, of course, so one week-end I took home the programming manual, and went into work the following Monday with a little program which I typed into one of the time-sharing terminals. Of course the program didn't run; all I got was an error message which seemed at the time to have no relevance to the situation, and I was so infuriated by the cocky way the machine kept insisting that I had made a mistake, without saying anything useful in explanation, that I resolved to beat it if it took me the rest of my life.

And that was it. By the time I had worked out what was wrong and had actually got some meaningful output I was hooked, and the addiction has not lessened since.

Well, you said you wanted just a few lines, and there you have them. I could, of course, rabbit on all night about those pre-BASIC days and the quaint goings-on at what was then the leading edge of the technology. Yes, before BASIC. My initial programs were written in TELCOMP, which I think was the first ever practical interactive language, derived from JOSS, which no-one seems to have heard of these days. TELCOMP was interpreted rather than compiled, just like BASIC, and for the same reasons, and one of the snags was that the interpreter and the rest of operating system occupied so much of

the scarce and expensive memory (magnetic cores, I suppose), that there was very little left to do any computing with. It was a bit like having a pocket calculator hooked up to the terminal, except that pocket calculators hadn't been invented yet.

I don't remember much about the TELCOMP language, which seemed to wither away as soon as BASIC became established. I just recall that programs were divided into parts, with part 1 driving the whole thing and the other parts acting like sub-routines. So part 1 was full of statements such as DO PART 4, or even DO PART 4 IF X=1. I also have a dim recollection that, initially at least, the only way the SAVEing and LOADing was to and from punched paper tape. Can anyone else remember any more?

I do remember, though, and very clearly, the deafening clatter that the type 33 Teletypes, universally used as computer terminals used to make. The noise was so bad that in our firm, at least, no-one would put up with the things in their offices, and the terminals were banished to an otherwise unused room. In their sublime wisdom our management put four of these monsters in one room, about the size of a small domestic bedroom. When more than one of them was working coherent thought, to say nothing of elegant programming, was quite impossible. Some users tried ear-muffs and everybody brought in papier-mache egg trays which they stuck all over the walls and ceiling. They had some effect, but the din was still appalling.

Another noisy beast, which came along a little later, was the line printer, which was faster than the teletype's 12 chars/sec, and to which output was diverted when you had a lot of text to print. (Hence the keyword LPRINT, short for LinePRINT, which we still use, but in a somewhat different way.) The

central feature of this awesome device was a rod on which were threaded 64 or 80 type wheels. It assembled a line of text by rotating the type wheels as required by the text to be printed, and when all was ready it issued a command which sent the whole lot crashing down on to the paper, thus printing the whole line at one go. This occurred several times per second, so the printing was fast, by the standards of those days, but the print quality left a lot to be desired. The characters were seldom well aligned along the line, and were often blurred because the wheels tended to strike the paper while still rotating.

There is at least one more historic keyword. In many of the old time-sharing systems, including the Honeywell variety, on signing on, you were asked if your problem was old or new. (Problem? I never had problems!) Anyway, if you replied OLD you were invited to type in the name of an existing program on file, whereas NEW cleared the memory and variables in much the same way as it does today.

By contrast, in the LEASCO system - and that's another name which has sunk without trace - the equivalent of our LOAD command was GET, and I once wrote a program which I called KNOTTED, just for the pleasure of typing GET KNOTTED and watching the machine, (which had been so cheeky when I was a novice), meekly do what I wanted.

I see I have been wittering on for nigh on two pages; much more than the few lines you asked for. I have just been back over the text and divided it up into paragraphs in a way which might make it a little easier for you to select a bit of inclusion in *FORMAT* if you wish. I am sure you will not want to print it all.

And now I really must stop. Good luck to INDUG and *FORMAT*.

PS I see that many of the illustrations on the front cover of *FORMAT* are

signed "JON". There was a cartoonist who used to delight the troops in North Africa and Italy during the last war with his pictures in the "Eight Army News", who also signed himself "JON". Since that was over half a century ago it could hardly be the same man, but do you happen to know if there is any family or other connection between them? And that really is the end of this letter!

Yours Sincerely, J.H.White.

There is no relationship as far as I have been able to discover between the two Jons. Our Jon is far too young (although he is about to age quite quickly because he is about to become a dad).
Ed.

Dear Editor,

Something or nothing for your next issue of *FORMAT*? As I enjoy reading your magazine I must agree with some of your readers that I too would like to see more Spectrum stuff.

As my wife calls me a Spectrum nut, the collectable type, and, as I have 35 various Sinclair computers from ZX81s to 128K Discs, add on key boards, printers/interfaces/joysticks/tape players and about 2000 programs, and a large loft, I suppose I am!

Anyone got a spare ZX80 to sell/part exchange or swap, are there any other readers as bad as this?

For your help page I am writing this on a Philips videowriter 4260 and I am running out of ribbon fast, anyone know of a supplier or have some collecting dust and wish to dispose of them?

Hope this will help you to fill a page.

Yours Sincerely, Tony Green.

I must admit I used to be as bad as you Tony, my loft and office were filled to the brim with different computers.

Even though I've trimmed my collection in recent years, Jenny is still always moaning about the stuff I manage to cram into the office. *Ed.*

Dear Editor,

Many Spectrum owners must be looking forward to hearing more news about the new clock and calendar device for their machines, I certainly am, and I hope West Coast Computers will find the sales figures for this new add on sufficiently encouraging to continue with the Spectrum market.

Also, I contacted New Young recently, and during conversation I mentioned how C for the SAM seems to be taking off rather nicely, and said that I wondered if FRED Publishing or someone might consider a C for Spectrum at some stage in the future.

Nev replied that he thinks that such a version did exist, and this was known as HISOFT C which although at first appeared on tape, a disc version was later produced.

HISOFT unfortunately no longer exist, and so to obtain a copy will mean starting a quest.

We would be grateful and interested to know, if anyone out there can tell us how this might be available, and (this is very important) whether it is compatible with Uni-Dos?

My regards to Jenny, I hope she had a most enjoyable 'snap' holiday, and that by the time this letter reaches you, the weather will be a lot more Editor friendly.

Yours Sincerely, C.A.Walford.

Yes thankyou, and as I'm tapping this in I'm off again tomorrow for another holiday, leaving Bob to sweat and toil over the birthday issue of *FORMAT* and a long list of other things he has to do.

Jenny.

Hisoft still exist, in fact it was only a couple of weeks ago I had someone telling me about the Pascal they had just purchased. *Ed.*

Dear Editor,

I would like to place an order for an internal 256K upgrade (W1108) for my

SAM. I have enclosed a cheque for thirty four pounds and ninety five pence to cover the cost of this. I have to say that I am not very happy about having to pay so much for this extra memory. The price has put me off for the last five years but I now find I have no option if I want to program in C.

On a lighter note, I would like to thank you for an interesting and useful magazine. It's good to be able to find out what is happening in the SAM world.

I wish you continued success for the future.

Yours Sincerely, Geoffrey Gradon.

Extra memory always has been expensive, and not just for SAM. Considering it was £29.95 in the days of MGT it has been good that West Coast has kept it down to £34.95 considering the price of memory has more than doubled in the last three years - one of the main reasons for the shortage of One Meg units these days. *Ed.*

Dear Editor,

Sorry to have missed the first opportunity for renewal. I need my monthly 'fix' of *FORMAT*. You are doing an amazing job there.

My SAM is giving sterling service at present helping me produce the Journal of the Croydon Model Railway Society. I wonder how many other publications depend on SAM's or Spectrum's?

Yours Sincerely, Peter Wood.

I'm sure there are Peter, and I'm sure readers will be quick to tell us about them. *Ed.*

Letters may be shortened or edited to fit on these pages although we try to edit as little as possible.

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DON'T MISS IT - DON'T MISS IT

FASTFILE

Sorting & Printing

Part 2.

New Routines for FASTFILE By:- Cliff Jackson.

Ok, by now you should have the machine code typed in that I gave you last month. So lets continue with a bit more of an explanation.

The objectives I set myself for the main machine code routine were:-

1. Find the start of b\$ (the first byte is always the token "STOP", CHR\$ 226).
2. Store it for use next time round - we need to go right through the file virtually as many times as there are entries in it, at least the first time when all the data will be in random order.
3. Find the end of the first entry (to be referred to as w1 (word one)) by counting through until CHR\$ 226 is found. This count ends with both the length of w1 and start address of w2. Store both.
4. Do the same for w2 but along the way compare w1 and w2 to decide if the entries need to be switched.
5. If so, copy w1 into spare memory temporarily.
6. Copy w2 to over-write w1.
7. If w1 and w2 are unequal in length, calculate the new start address of w2 then copy w1 there. W1 and w2 are now reversed.
8. Store the address and length details of the old w2 in "D1" and "L1", the memory locations holding details of w1, as the old w2 will become the new w1 when we continue to the next word.
9. If a switch was not needed then just swap statistics as in 8 above and press on.
10. On the way look out for the "-" which was inserted to mark the end of the text in b\$ (which will almost certainly not be the last byte in b\$).

Now, how do we use it? Well at first I had intended to put the code in high memory, around 64000, but b\$ extends higher. The Execute file was the answer but as this is DISCIPLE and PLUS D specific, I have instead assembled the code to 20000, within screen memory. This is very convenient if the code is to be used only once and no screen output is generated. This will enable those with Microdrives or other systems including tape to use it. I expect that anyone using *Fastfile* with Microdrives will have found it necessary to dimension b\$ to a lower figure, say, 39000 or perhaps even lower if individual entries are long. If you already have data in *Fastfile* and wish to re-dimension b\$ without re-entering all the data at the key-board then we will look at that in due course.

By using the screen area it has been possible to sort b\$ without separating it from *Fastfile* and this avoids the problems which can occur on re-loading if it is not done in the right way details later.

The 'morse code' on the screen is the machine code and the flickering bits at the end are the changes being made in the storage (routine variables) area. It

takes a few minutes to run.

Follow these steps exactly:-

1. With *Fastfile* loaded, BREAK at menu (Line 100)
2. Key - LET b\$(n)="" (+ENTER)
3. Key - PRINT n - and write down the value just in case!
4. Key - CLS : LOAD D1"b\$sortC" CODE 20000 (modify for your system)
5. Key - RANDOMISE USR 20000
6. Key - PRINT b\$ - just to check.
7. Key - GOTO 100 - Back into *Fastfile*.
8. SAVE *Fastfile* via Menu option.

That's it, well unless you have added to *Fastfile's* Basic in which case you may have had the "out of memory" message or even worse. Fear not. Re-load if necessary and follow 1 - 3 above.

1. Key - SAVE d1 "b\$" DATA b\$()
2. Reset machine
3. Key - LOAD "b\$" DATA b\$()
4. Key - CLS : LOAD "b\$sortC" 20000.
5. Without disturbing the screen POKE 20014,6 - see below
6. RANDOMISE USR 20000
7. When sorted, Key - SAVE "b\$alpha" DATA b\$()

Now the job of getting "b\$alpha" back into *Fastfile*. This is not straightforward as *Fastfile's* search routine, like my sort routine expects to find the start of b\$ 49 characters after the value returned by VARS. This is because the set-up routine on page 28 of *FORMAT 2/8* initialises 'n' and DIMensions a\$(31) before it DIMensions b\$. If b\$ is re-loaded with the other variables in situ then the old b\$ is not over-written but is deleted and the new one added at the end of the variables already in memory. This will include those created by the program itself. The search routine will not then

work correctly.

Fastfile uses the start of the variables area as follows:-

Variable: "n" 6 bytes - holding name, type & value
Variable: "a\$" 37 bytes (6 + the 31 dimensioned)
Variable: "b\$" 39508 bytes (6 + 39502 dimensioned)
followed by variables created when the program runs.

Thus the first byte of b\$'s data is normally at VARS + 49 (6+6+31+6) but if we reset the machine before re-loading b\$ then the first byte will be at VARS + 6. With the sort code in (screen) memory, POKE 20014,6 overwrites the 49 in line 150 of the Assembler Listing given last month and points the code to the right place. By loading b\$ without *Fastfile's* basic in memory we get a bit more 'elbow room'.

Type in the following program and save as "fastsetup" after amending the load instruction to suit your system, and filename if different. Do NOT use LINE or make any other additions or alterations.

```
10 CLEAR : INPUT "Value of "n
"" :/n: DIM a$(VAL "31"): L
OAD d"b$" DATA b$(): LET L
=SGN PI: LET o=NOT PI: LET
b$(L)="" : LET m=VAL "100":
LET k=VAL "23556": LET n$="
A": LET s1=VAL "23670": LET
s2=s1+L: STOP
```

Reset machine and reload *Fastfile*. CLEAR. MERGE in "fastsetup". RUN it entering value of "n" previously written down. Key "10" (+ENTER) to get rid of line 10, the fastsetup routine. GOTO 100 and Save *Fastfile* from the menu. Data is now alphabetical and ready for printing. In preparation for this BREAK again and SAVE "b\$alpha" DATA b\$() ready for the printer routines. See you next month.

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